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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/553,997	04/20/2000	Douglas A. Buchanan	13322(YOR92000-0036US1)	5913

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EXAMINER

VOCKRODT, JEFF B

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 09/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/553,997

Applicant(s)

BUCHANAN ET AL.

Examiner

Jeff Vockrodt

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 July 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 and 24-56 is/are pending in the application.
- 4a) Of the above claim(s) 4-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 13-22 and 24-56 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This office action is in response to the amendment filed on July 10, 2002. Claims 1-22 and 24-56 are pending. Claims 4-12 are withdrawn from consideration as indicated in the previous office action.

Claim Objections

Claim 2 is objected to because of the following informalities: amine is listed twice in claim 2. Claim 22 states "tetrahydrogran." Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following are quotations from the first and second paragraphs of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-3, 13-22, and 24-56 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 requires a precursor having the formula: $MR^1_xR^2_yA_z$; $x > 1$; $x+y=\text{valence of M}$; and $z > 0$. A_z is a coordinatively bound or associated ligand. If $z > 0$ and A_z is coordinatively bound, then $x + y$ cannot equal the valence of M. In fact, under these conditions, $x + y$ would have to equal the valence of M minus z . It seems that for a coordinatively bound ligand $x + y + z = \text{valence of M}$ and for an associated ligand $x + y = \text{valence of M}$.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1, 3, 18, 22, and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Pat. No. 5,650,361 ("Radhakrishnan").

Radhakrishnan teaches a method of depositing AlN using CVD. Trimethylamine alane (TMAA) $N(CH_3)_3AlH_3$ and ammonia NH_3 were used as precursors. In terms of MR1R2A, M=Al; R1=hydride; R2=hydride; A=amine (trimethylamine). The inert liquid is ammonia (see claim 18 which lists ammonia as a possible inert liquid).

Claims 1, 2, 3, 14, 15, and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Pat. No. 5,337,651 ("Gardner '651").

Gardner '651 teaches using trimethylamine alane with hexane as a solvent in a vapor deposition process (col. 3, ll. 17-24). Claim 1 reads on trimethylamine alane as discussed above.

Claim 2. Hexane is an aromatic hydrocarbon.

Claim 3. Restricting one R group to a hydride does not distinguish over trimethylamine alane.

Claim 14. Hexane has a higher boiling point than trimethylamine alane.

Claim 15. Hexane is a C5 alkane.

Claim 24. Gardiner '651 teaches chemical vapor deposition.

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Claims 1, 2, 14, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Pat. No. 5,231,061 ("Devore").

Devore teaches organometallic coating precursors including various amido containing precursors including tetraamides of Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, and a triamide of B (Table, col. 7, ll. 40-54). These precursors employed are toluene, heptane, octane, hexane, and pentane (col. 8, ll. 15-30).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 14-15, 24-26, 28-32, 39-40, and 49-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardiner '651 in view of U.S. Pat. No. 5,998,870 ("Lee").

Gardiner '651 teaches a method of depositing an aluminum film using a trimethylamine alane precursor that is diluted in a solvent as discussed with respect to claims 1, 2, 3, 14, 15, and 24 above. Gardiner '651 does not teach forming an aluminum wiring layer.

Lee teaches that alane precursors are used to form aluminum films that are made into wiring structures.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the process of Gardiner including a trimethylamine alane to form an aluminum wiring layer, because aluminum processes employing alanes were well known and desirable for forming aluminum wiring layers as taught by Lee.

Response to Arguments

Applicant's arguments with respect to claims 1-3, 13-22, and 24-56 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning communications from the examiner should be directed to Jeff Vockrodt at (703) 306-9144 who can be reached on weekdays from 9:30 am to 5:00 pm EST. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached at (703) 308-4940.

The fax numbers for this Group are (703) 305-3432, (703) 308-7722, (703) 305-3431, and (703) 308-7724. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist at (703) 308-0956.

September 22, 2002

J. Vockrodt



CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
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